TRIBULUS

Journal of the Emirates Natural History Group

Vol. 13.1 Spring/Summer 2003

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NOTES FOR CONTRIBUTORS

TRIBULUS is the Journal of the Emirates Natural History Group and was launched in 1991. The Group was founded in 1976, and over the next fourteen years, 42 issues of a duplicated Bulletin were published.

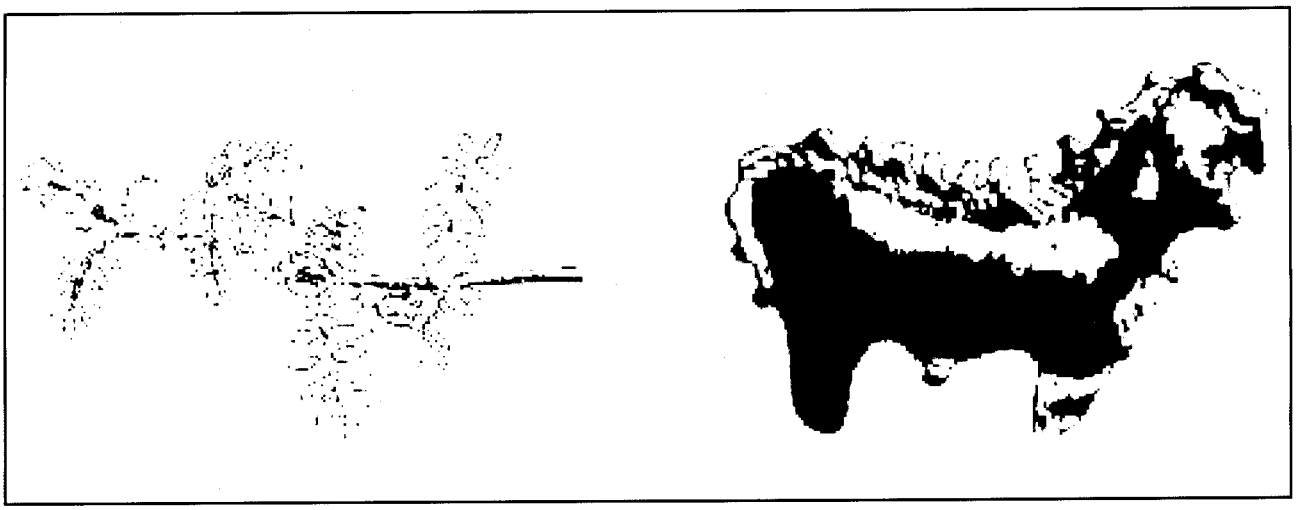
TRIBULUS is published twice a year. The aim of the publication is to create and maintain in standard form a collection of recordings, articles and analysis on topics of regional natural history, heritage, geology, palaeontology and archaeology, with the emphasis on the United Arab Emirates and adjacent areas. Papers, short notes and other contributions are welcomed from anyone but should not have been published elsewhere. Guidelines are set out below. The information carried is as accurate as can be determined, in consultation with the Journal's Advisory Panel and referees, but opinions expressed are those of the authors alone.

All manuscripts received are reviewed by the Editorial Board and appropriate Advisory Panel members and, where appropriate, are also submitted to blind peer review.

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The plant motif above is of the genus Tribulus, of which there are six species in the UAE. They all have pinnate leaves, yellow flowers with free petals and distinctive five-segmented fruits. They are found throughout the country, except in coastal sabkha.

The animal motif above is of a tiny golden bull, excavated from the early Second Millennium grave at Qattarah, Al Ain. The original is on display in Al Ain Museum, and measures above 5 cm by 4 cm.

Manuscripts should be submitted in electronic form, with a printed copy, typed on one side only, and double-spaced. A short abstract should precede the article, with the address(es) of the author(s) at the end. Photographs may be submitted and should be clearly captioned. Line drawings and maps, if not submitted in electronic form, should be in black ink on strong white or translucent paper. References should give the author's name, with the year of publication in brackets, and with the list of articles, showing title and publisher, in date order. Scientific names should follow customary nomenclature in Latin, while the English and, if appropriate, available local Arabic names should also be supplied.

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Front: *Cynomorium coccineum.*

.....Picture by Gary Brown

Back: Excavation of the lower jaws of a Late Miocene elephantid, near Ruwais

..... Picture by Peter Hellyer

The Editorial Board of TRIBULUS and the Committee of the Emirates Natural History Group acknowledge, with thanks, the support of the Group's Corporate members, a full list of whom can be found on Page 2, without whom publication in this format would be impossible. We also acknowledge the support and encouragement of our patron, H.E. Sheikh Nahayan bin Mubarak Al Nahayan, UAE Minister of Higher Education and Scientific Research.

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EDITORIAL

The objective of this journal, and of the Emirates Natural History Group, now over a quarter of a century old, is to promote knowledge of, and scientific research into, the cultural and natural heritage of the United Arab Emirates. In the case of ***Tribulus***, that objective is pursued through publication, and we hope that the range of topics in the twenty-five issues so far published has given an idea of the amount, and quality, of the work that is being done.

The topic of scientific research is one which has been receiving increasing official attention lately, with our Group Patron, Sheikh Nahayan bin Mubarak Al Nahayan, the UAE Minister of Higher Education and Scientific Research, specifically calling for more attention to be paid to the need for research.

Such research cannot, however, and should not be considered as merely a responsibility of Government, or of the various semi-governmental institutions, however productive they may be. There is a role for non-governmental organisations, like the ENHG, for academic institutions and for the interested private individual to contribute. There is, too, a role for the corporate sector to play, in providing the environment where research, and the publication of it, can flourish. In some cases, the corporate sector can contribute directly by commissioning research, as do Abu Dhabi's water, oil and gas sectors, in order to meet their own Health, Safety and Environment policies. In other cases, companies can contribute in terms of hard cash for particular projects, as the Corporate Sponsors of the ENHG have done, and continue to do, by making publication of ***Tribulus*** possible.

We welcome, and are grateful for, their support for the journal, and also for the pursuit of scientific research which may often appear to have little direct relevance to their core activities.

This issue of ***Tribulus*** has, once again, a focus on archaeology, with three contributions. The paper on survey and excavations in the Wadi Saqamqam, Fujairah, by Dr. Michele Ziolkowski, as it happens, reports on work that would not have been possible without funding provided by two of Abu Dhabi's major companies, the Union Water and Electricity Company,UWEC, and Dolphin Energy, first for the original baseline surveys, and then for the detailed survey and excavations.

The paper is more detailed than many previous archaeological papers we have published in the journal. We have chosen to do so for a variety of reasons. The total of 126 pre-Islamic graves in one small area is remarkable, while the fact that their existence had only been recognised a year or so earlier, is a good indication (as if we really needed it!) that there are still many important archaeological sites in the country that have not yet been recognised and recorded. We hope that the many photographs accompanying the paper will help readers, and others, to identify similar sites if they should come across them.

Dr. Geoffrey King's paper on the pottery from Lima is also an important contribution. The identification and dating of Late Islamic pottery from the UAE and adjacent areas is a poorly studied subject, and for many years, archaeologists have simply lumped much of such pottery together as being of types originating from the Wadi Haqil, in Ra's al-Khaimah, where pottery was produced from the 14th or 15th Century until 1970.

Dr. King's paper not only shows that pottery manufacture continues in a traditional way in Musandam (very different from the commercial pots on show at Masaf's 'Friday Market') but also that a re-evaluation of the whole range of unglazed Late Islamic pottery from south-eastern Arabia is required.

The third, shorter, paper, by Clare Gillespie, of the Qatar Archaeological Project, extends the geographical scope of this ***Tribulus*** to just west of the UAE, but with good purpose - to show the affinities between sites on Qatar's islands and on those of Abu Dhabi.

Mark Beech's paper on osprey diet combines neatly both birds and fish. Previous papers have dealt with the diet of other fauna, including both birds and reptiles, and it is pleasing to be able to continue to tackle this topic. Further contributions on the diet of the UAE's fauna, whether terrestrial, marine or avian, would be welcomed.

Two other short notes come from regular ***Tribulus*** contributors Gary Feulner and Richard Hornby, both of whom respond to notes by Michael Gillett in the last issue of the journal. Too often, papers, in this and other journals, are published without prompting responses that add further information to the topic discussed, and the Editorial Board is delighted to be able to publish these two contributions.

The issue closes with three book reviews and a bibliographical summary. Over the last few years, the number of books published on the UAE's history and natural history, or aspects thereof, has been growing rapidly, and we shall endeavour to review as many as we can of those we deem worthy of being drawn to the attention of our readers.

Authors need not, however, expect an easy ride if they do not deserve one! Confident publishers might like to note, though, that review copies are always welcome.

Corporate Members of the ENHG

Production of *Tribulus*, and many of the other activities of the Emirates Natural History Group, including the grant programme of the Group's Conservation Fund, would not be possible without the generous support of the Group's Corporate members, many of whom have provided consistent assistance over many years. The Editorial Board and the Group Committee acknowledge, with thanks, the invaluable support of the following companies and bodies, currently Corporate members of the Group, and all past corporate sponsors:

Abu Dhabi Company for Onshore Oil Operations, ADCO; Abu Dhabi Gas Industries Ltd., GASCO; Al Fahim Group; Al Nasser Holdings; Beach Rotana Hotel; British Petroleum (BP); Denton, Wilde, Sapte; Emirates Holdings; Environmental Research and Wildlife Development Agency, ERWDA; Kanoo Group; Le Royal Meridien Abu Dhabi; Metco; Motivate Publishing; National Bank of Abu Dhabi; Omeir Travel Agency; Richards Butler International Law Firm; Serco-IAL Ltd; Trowers & Hamlin; Union National Bank; WESCO.

A preliminary survey and excavations in the Wadi Saqamqam, Fujairah, UAE

by Michele Ziolkowski

Introduction

An archaeological survey of the route of the Qidfa to Al Ain water pipeline, undertaken for the Union Water and Electricity Company, UWEC, by the Abu Dhabi Islands Archaeological Survey, ADIAS, in November and December 2001, led to the discovery of archaeological sites in Wadi Saqamqam, just north of Fujairah (Hellyer 2001) **(1)**. Initially some of the sites appeared to be under threat from the planned pipeline construction, but, following recommendations made in the original survey report, the route was moved slightly. Further sites were noted in the vicinity of the pipeline route in December 2002, during a re-examination of the route for Dolphin Energy Limited, who were planning a parallel gas line from Al Ain to Qidfa (Hellyer *pers. comm.*).
It was then agreed between Dolphin and ADIAS that a detailed archaeological survey of the Wadi Saqamqam should be carried out. This was undertaken by the author, Sheikh Abdullah Suhail al-Sharqi and Mr Mohammed Hassan during the period from January 7th to 15th, 2003.

The Site

The site is located in Wadi Saqamqam, situated around 7 km. north of the city of Fujairah (*Plates 1 & 2*), to the west (inland) of the coastal plain opposite the Port of Fujairah. The archaeological features are located between the operational rock-crushing area of the Fujairah Rock and Aggregate Company to the east and the water and gas pipeline route to the north and west. The wadi is scoured by numerous small ravines which flow with water when the wadi is in spate. The wadi plain is covered with large boulders, many of which have either tumbled from the surrounding mountains or have been deposited in the wadi by floods. The wadi is surrounded by mountains that form part of the Hajar mountain range. The dominant vegetation present in the wadi is the sidr *(Zizyphus spina-christi)* tree.
The site of Wadi Saqamqam consists of a number of archaeological features. These include prehistoric burials, settlement features (rock walls (*Plate 3*), cleared areas (*Plate 4*), a *mihrab*? (*Plate 5*), a possible mosque, rock-built enclosures (*Plates 6, 7 & 8*) [houses and/or animal pens] and a fox trap, WS126), with Islamic period ceramics scattered over the surface of the site. The purpose of the survey was to record the prehistoric graves present at the site. Note was also made, however, of the settlement remains from the Islamic period (recorded as features).

Survey Objectives

The objectives of the survey were to develop a more detailed understanding of the prehistoric burials present in the Wadi Saqamqam; to record relevant details which may aid further research and analysis of the site; and to



Plate 1. General view of Wadi Saqamqam, facing north-west, with the pipeline in the background.



Plate 2: General view of the area of sites, facing south-south-west. Site WS 26 in foreground.

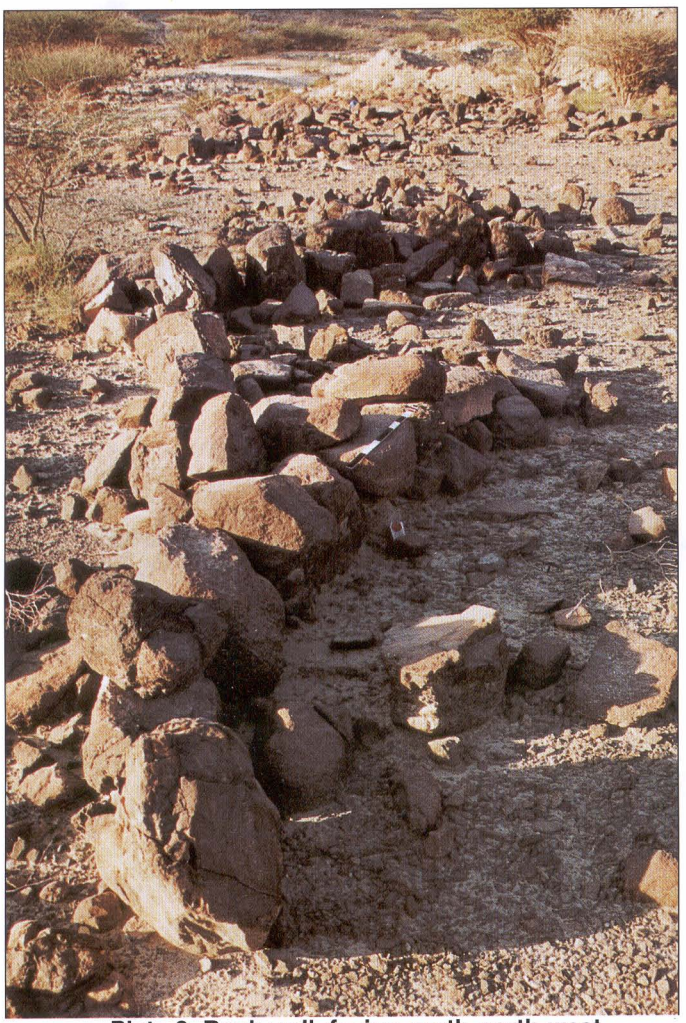
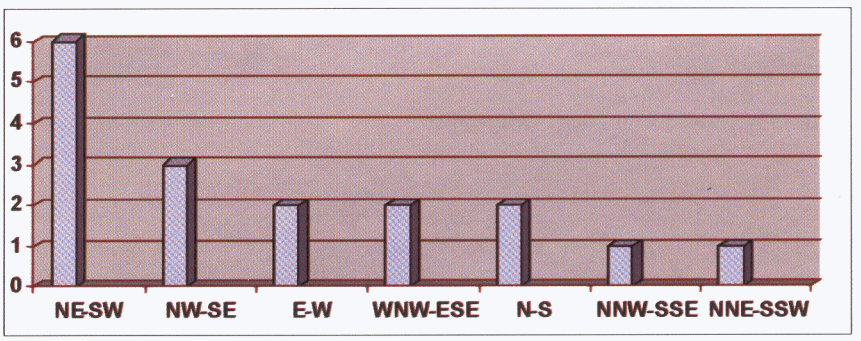


Plate 3. Rock wall, facing north-north-west

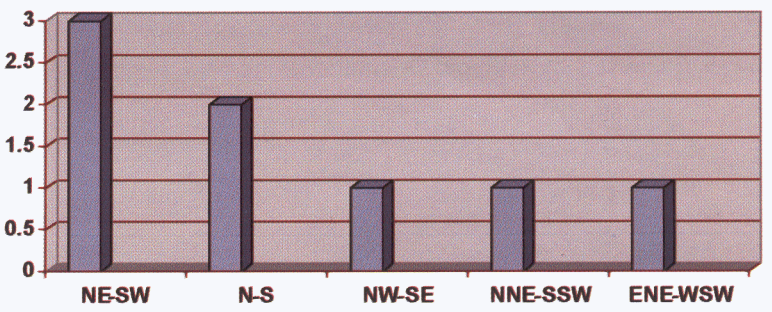
Table 1
Circular graves were not included in this analysis, since they lacked clear orientation.

Burial Shape/Type	Orientation	Total
Ovoid	NE-SW	6
	E-W	2
	NNW-SSE	1
	WNW-ESE	2
	NW-SE	3
	N-S	2
	NNE-SSW	1
Three conjoined	NE-SW	3
	NW-SE	1
	NNE-SSW	1
	N-S	2
	ENE-WSW	1
Six conjoined	WNW-ESE	1
Oval	NE-SW	7
	NW-SE	5
	E-W	6
	WNW-ESE	1
	NNE-SSW	2
	ENE-WSW	3
	N-S	7
	NNW-SSE	1
Figure eight	NE-SW	3
	NW-SE	3
	N-S	7
	ENE-WSW	1

Graph 1:
Ovoid burial type (Orientation)



Graph 2:
Three conjoined burials (Orientation)



place the burials in context. Burials noted during the survey were numbered and GPS coordinates were registered throughout the wadi. Descriptions were recorded, these including shape, size, construction materials and methods, the orientation of the grave, surface finds present, disturbance, significant features and context. A photographic record was made, with comments being recorded. Descriptions of the various non-burial features were also recorded in order to provide a more detailed account of the site.

Recording the site

The boundary of the surveyed area encompassed most of the main wadi behind the rock crushing company where the features were initially noted, the mountains surrounding the wadi acting as a natural barrier for the scope of the survey. The smaller tributary wadi in the southern region of the site also acted as a natural boundary. The water pipeline located in the north and western areas of the wadi was also used as a cut off point for the survey.

The survey was conducted on foot. A grid system was not used. Instead archaeological and topographical features were used to subdivide the region (after Kennet 1994: 164). Initially the site was walked over in a zig-zag pattern in order to locate as many burials and features as possible. The burials were subsequently numbered and GPS coordinates were recorded, using the WGS84 datum.

After the initial walk-over of the site, the steps were re-traced and detailed information was recorded for each burial. Another aim of the second walk-over was to locate any burials/features missed during the first sweep through the site. A standardised recording sheet was used in the field. This recording sheet was also used as an aid in post-field analyses. To complement the written details, a clear photographic account completed the recording process. A 50cm scale was used.

Burial Types

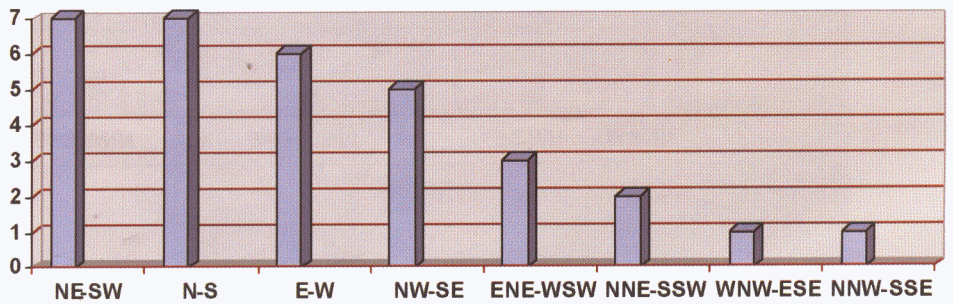
A total of 126 graves were recorded in the Wadi Saqamqam. The graves were of varying shapes, including ovoid, oval, circular and figure-of-eight (a combination of two conjoined graves of either oval and/or circular shape), and multiple conjoined graves (three and six) (*Plate 9*). These graves were interspersed within an area containing a number of Islamic period settlement features.

Overall the graves were oriented in a variety of directions, variety also being present within burial shapes/types. Two directions appear to have been more prevalent than others, those to the NE-SW and N-S. However, these results are not consistent throughout the burial types.

Based on these results, which show that the graves are not aligned in accordance with Muslim practice, one may assume that the Wadi Saqamqam burials are of pre-Islamic date. The presence of pre-Islamic burials densely dispersed within an area of Late Islamic settlement is not unusual in Fujairah or elsewhere in the Hajar Mountains of the United Arab Emirates

The deflated nature of many of these burials may be reflective of a number of variables. Firstly, appropriation of the rocks for use in constructing the settlement features, secondly, alluvial wash passing through the wadi whilst it is in spate, and thirdly, the activities of the nearby rock crushing company. Blasting was conducted on the surrounding mountains by the Fujairah Rock and Aggregate Company whilst the survey was undertaken. These explosions sent tremors throughout the base of

Graph 3: Oval burial type (Orientation)



Graph 4: Figure 8 burial type (Orientation)

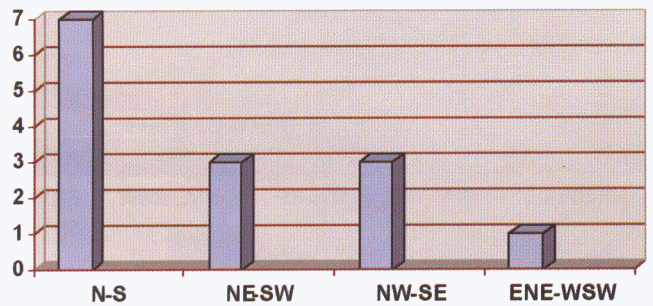




Plate 4: Cleared areas and rock walls, facing south-west. Feature WS f.5 in foreground



Plate 5: Feature WS f.22, possible mihrab, facing west-south-west

the wadi and beyond. Such tremors may have affected the dry stone masonry of the burials and features recorded during the survey.

Surface Finds (ceramic)

The majority of surface ceramics were red coarse ware sherds. These were comparable in fabric to examples produced in Ra's al-Khaimah. Red coarse ware was (and still is) produced at Lima in the Musandam Peninsula (Sultanate of Oman) (*see King, this volume, pp.* 19-21) (Ziolkowski 2002:1:283). It is probable that the material recovered in Wadi Saqamqam was imported from a number of ceramic production sites, including Ra's al-Khaimah and Lima. The examples from Wadi Saqamqam may be loosely dated to the Late Islamic period (17th to 20th Century AD).

One body sherd collected from the surface is comparable to a particular form of water jug (*Plate 10*). This sherd consists of a red coarse ware fabric, with a cream slip on the exterior and one vertical line of red-brown coloured paint. The fabric has mineral inclusions including brick red, plate-like fragments measuring 1mm. It also contains orange, black, grey and white irregularly shaped mineral inclusions, measuring 0.5-1mm. The sherd has small round voids of 0.5mm or less. Examples of this type of water jug with similar fabric, form and decoration have been recovered from a number of sites including Julfar (Ra's al-Khaimah) (De Cardi & Doe 1971: 269; Hansman 1985: 74; Sasaki 1991: 212; Sasaki 1993: Fig. 19a: 44), Khashm Nader and Al-Khatt fort (Ra's al-Khaimah) (de Cardi & Doe 1971: Fig 17 & 51), Northern Oman (De Cardi 1975: 65-73), Aden (Yemen) and from the 'Great Mosque' at Kilwa (East Africa) (Chittick 1974: Fig 143a, 331). Three semi-complete vessels and three sherds of this type were recovered from excavations at the site of Bidiya 3 (Site 46, Fujairah, Portuguese fort),vessels, BP 239 *(Figure 1)*, 240 and 241, sherds, BP 208, 220 & 270 (Ziolkowski 2002: 346-8) **(2).** The examples from Bidiya were dated to the 16th and 17th Centuries (Ziolkowski 2002: 373-6). Hansman has dated the Julfar examples to the 16th and 17th Centuries (Hansman 1985: 74). Examples of this vessel type recovered by the Japanese mission at Julfar were dated to the 16th Century (Sasaki 1991: 212). Chittick dated the Kilwa examples from the late 15th to 16th Centuries (Chittick 1974: 331). Vessels of this type have been found on the east Arabian coast from Bahrain to Oman (Hardy-Guilbert 1991: 190). According to Hardy-Guilbert, this ware, recovered from Julfar, is a unglazed ware of local production (Hardy-Guilbert 1991: 185 & 188).

Sherds of a fine ware fabric, both with or without incised decoration, were also recovered from Wadi Saqamqam. The paste varied in colour between buff, cream, pale orange, orange, orange-red, and orange-brown **(3).** Glazed Khunj ware sherds were also collected from the surface at Wadi Saqamqam. At Khatt 89 (Ra's al-Khaimah), considerable quantities of Khunj ware was recovered from the site and were dated from the 16th to 18th Centuries (De Cardi *et al.* 1994: 63). A few examples of other glazed ware sherds were also recovered from Wadi Saqamqam. Unfortunately, the glaze was very badly worn and the original colour indiscernible.

Burial architecture

The burials in the Wadi Saqamqam may be compared with examples from the site of Traif, Kalba (Sharjah Emirate). A number of these burials were excavated by



Plate 6: Feature WS f.5 in foreground, various enclosures, facing north-north-west.



Plate 7: feature WS f.21, an enclosure, looking south-south-west



Plate 8: Enclosure/house, near WS 68, facing north-west

Dr Sabah Jasim from the Sharjah Department of Antiquities. Many of these burials were previously noted by Beatrice de Cardi in her 1971 article published in the journal, *East and West* (De Cardi 1971: 241, 257-8) Examples of both single and multiple conjoined burial cairns were recorded at Traif. Like those at Wadi Saqamqam, these cairns were also built with mountain rocks and wadi boulders. The Traif burials have been dated to the mid 2nd millennium BC (Jasim: 12-13). Dr Jasim has compared the Traif burials to examples located at Asimah, Wadi Ashwani (Ra's al-Khaimah Emirate) and Qidfa West (Fujairah Emirate) (Jasim: 10).
An example of an Iron Age burial illustrated in Potts, *Arabian Gulf in Antiquity: Vol. I,* depicts three conjoined burials (Potts 1990: Fig 38b: 360). This example, plus a small concentration of pillbox graves were recorded at the site of Maysar 27 (Sultanate of Oman, near Wadi Samad) (Potts 1990: 372). On a cursory level, these burials may be comparable to a number of examples from the Wadi Saqamqam survey.
The Swiss Archaeological Survey also noted numerous burial cairns throughout Fujairah. These include Site 7-Husn Madhab; Site 18-Fujairah Hospital; Site 19-Fujairah Airport; Site 20-Fujairah Tiles Factory (a large necropolis, containing single and conjoined burials); Site 25-Sqamqam A; Site 26-Saqamqam B; Site 28-Saqamqam C; Site 32-Saqamqam Primary School; Site 34-Sharm; Site 36-Fujairah-Madhab; Site 43-Bithnah A; Site45-Bithnah C; Site 46-Bithnah D; Site 55-Jebel Haqab (more than 80 examples spread across Fujairah and Sharjah emirates; often 2-7 examples in a line; groups; Iron Age?); Site 61-Husn Madhab B (Iron Age ceramics); Site 62-Husn Madhab C (Iron Age ceramics) (Corboud *et al.* 1991: 7-19). A detailed drawing of the burial cairns from Site 20-Fujairah Tile Factory was recorded during the Swiss Survey of 1993 (Corboud *et al.* 1994: 12). This illustration depicts two oval shaped, conjoined burial cairns. Both burials contain a double ring wall **(4).** These burials appear to be somewhat more substantial in construction than the examples recorded at Wadi Saqamqam.
According to Dr Christian Velde (Resident Archaeologist, Ra's al-Khaimah Museum), a number of the ovoid shaped burials recorded in Wadi Saqamqam may date from the Wadi Suq period (2000-1300 BC). Dr Velde stated that these graves might contain subterranean burial chambers, with an above-ground superstructure. Wadi Saqamqam 126 (WS126) is possibly an example of this grave type (*Plates 11 & 12).* However, the above-ground features present on the burial are, in fact, an alteration to the original construction details. The burial has been altered to form a 'fox trap', commonly used throughout the historical periods (Velde *pers. comm.* 2003).



Plate 9: Site WS 61, three conjoined burials, facing south-south-west



Plate 10. Surface sherd from Wadi Saqamqam

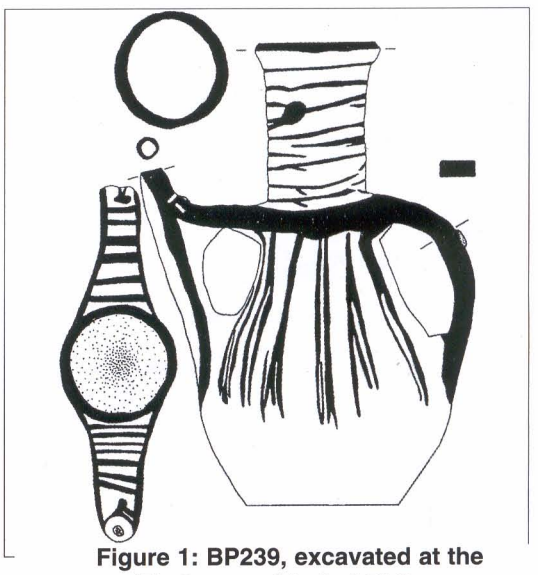


Figure 1: BP239, excavated at the 'Portuguese' fort at Bidiya.



Plate 11. Structure WS 126, facing west



Plate 12. Structure WS 126, facing north

Excavation Report

The excavation at Wadi Saqamqam took place between the 1st and 11th March 2003. Three graves were chosen for excavation, WS 39, 40 and 51. WS 39 is circular in shape, WS40 is oval, and WS51 is of a figure-eight pattern.
A 3x4m area was marked off around each grave, forming a grid system oriented north-south. The aim of the grid system was to enable finds to be given an easting and northing coordinate. At each site an iron peg was securely fixed at a high point beside the burial. The tops of these pegs were used as datum points. They were arbitrarily considered to be 100m above mean sea level. Each grave was planned prior to and after excavation using a 1x1m drawing frame. A 1m scale was used for the photographs. A standardised recording sheet was used during the excavation.

WS39
GPS: (WGS84)
N 25° 11' 38.0"
E 56° 19' 52.6"

WS39 was a circular shaped grave measuring 1.4x1.4m and was located on the central wadi plain (*Plate 13*). This burial contained one to two courses of rocks. It was situated within close proximity to a number of burials and other features. These features include two rock-built enclosures and various wall alignments.
Surface ceramics included red coarse ware sherds, and a base sherd from a footed vessel, which once contained an interior glazed surface. These have been dated to the late Islamic period. A body sherd of Late Islamic period Khunj/Bahla ware was also recovered from the surface beside the grave within the string-line.
Surface level, Layer 1: 99.56m. At 98.87m we excavated down to a layer of dense gravel with rocks. This material was rather difficult to excavate through and therefore we decided to stop. Base level, Layer 6: 98.80m (*Plate 14*). A total of 76cm had been excavated. There were no finds from within WS39.

WS40
GPS: (WGS84)
N 25° 11' 38.3"
E 56° 19' 53.3"

An oval shaped burial measuring 2.0x1.5m (*Plate 15*). One to two courses remaining. WS40 was also located on the central wadi plain, within close proximity to WS39. There also appeared to be another smaller burial to the south-east of WS40. A small oval shape, measuring 1.2x0.75m; height 0.2m; 1-2 courses.
Surface ceramics were collected from beside the burial. These included a base sherd from an open footed vessel. The interior glaze was badly worn and the original colour difficult to determine. Two red coarse ware body sherds were also recovered. Two more body sherds (adjoining), creamy in colour and sandy in texture, with a badly worn glazed surface, were also collected. One Late Islamic period ceramic sherd was recovered from Layer 1 (a red coarse ware type rim sherd). Level: 99.52m (i.e. 5cm below the surface level). E 1.10m, N 1.78m.
Surface level, Layer 1: 99.57m. In Layer 2 the gravel became harder and more compacted. This became notably difficult to excavate through. A base level was determined at: 98.77m (*Plate 16*). A total of 90cm was excavated from WS40.

WS51

GPS: (WGS84)
N 25° 11' 35.4"
E 56° 19' 51.7"

WS51 contained two connecting burials (*Plate 17*). Chamber A was oval in shape, with one course of rocks remaining, and Chamber B was circular in shape, containing 1-2 courses. Chamber A measured 2.20x2.0m and Chamber B was 1.20x1.20m.
Excavation began in Chamber A. Initially part of the rock wall on the western side of Chamber A was delineated. Soft sand was removed from this area and a line of rocks became visible. This soft, orange-coloured sand has presumably been washed down the wadi from the pipeline route, which runs along the back of the wadi and where sand of this colour has been introduced. .
Surface level, Layer 1: 99.55m. Base level, Layer 2: 99.05m. A depth of 50cm was excavated from Chamber A. One red coarse ware rim sherd of Islamic period pottery was recovered from the western half of Chamber A, Layer 1; within the first 5cm.
Chamber B: Surface level, Layer 1: 99.57m. Base level, Layer 2: 99.06m (*Plate 18*). A depth of 51cm was excavated. There were no material finds.

Conclusions

The graves recorded and excavated in the Wadi Saqamqam may be compared with those at the site of Traif, Kalba, to the south of Fujairah city. The Traif graves excavated by Dr Jasim were noted for their paucity of material remains **(5)**.
The Wadi Saqamqam graves may, therefore, be considered as prehistoric in date, although a more precise chronology has yet to be determined. In summary, it is clear that the burial remains of the Wadi Saqamqam represent an important corpus of prehistoric material culture. These graves should be examined further and protected.

Acknowledgements

The site of Wadi Saqamqam was recorded and excavated with the kind permission and support of His Highness Sheikh Hamad bin Mohammad al-Sharqi, Ruler of Fujairah and Member of the UAE Supreme Council. Mr. A.K. Al Shamsi (Director of Fujairah Museum) and Mr. Salah Ali (Head Archaeologist, Fujairah Museum) should also be thanked for their cooperation and support.
Mr. Peter Hellyer, Executive Director, ADIAS, coordinated the Wadi Saqamqam survey and excavation projects. His support for the archaeology of Fujairah should be acknowledged.
Many thanks are also due to Dolphin Energy, and, in particular to their CEO, Mr. Ahmed Al Sayegh, for their financial support and encouragement, including support for preliminary survey work in late 2002 in the wadi, carried out by Messrs. P. Hellyer and S.J. Aspinall. Their contribution to this project is much appreciated.



Plate 13. Structure WS 39, before excavation, facing north



Plate 14. Structure WS 39, after excavation, facing north



Plate 15. Structure WS 40, before excavation, facing south



Plate 16. Structure WS 40, after excavation, facing east



Plate 17. Structure WS 51, before excavation, facing east



Plate 18. Structure WS 51, after excavation, facing east

My colleague in the field, Mr. Abdul Qader, worked very hard and diligently. I am very grateful for his help with the excavation. Mr. Amrik Singh must also be thanked for providing us with iron pegs and a lovely 1x1m drawing frame. Mr. Mohammad Hassan (ADIAS) helped during the survey at Wadi Saqamqam on January 7th.
I would like to thank my father, Mr. Les Ziolkowski, for giving up some of his holiday to help out with the preliminary work for the excavation at Wadi Saqamqam. During the survey work, I was helped on a number of occasions by Sheikh Abdullah bin Suhail al-Sharqi, who also provided much moral support during the excavation at the site.

Notes

1. The Swiss Archaeological Survey recorded 12 burial cairns and a settlement site in the tributary wadi running southwest from the main wadi (Site 30). These cairns were recorded as measuring 11m in diameter and 2m in height. Some burials were formed by 2-3 adjoining circular shaped cairns (Corboud *et al.* 1991: 12). From a cursory investigation of this wadi, it is unclear whether or not these burials have survived. The wadi has been badly disturbed and bulldozed.

2. BP 239: Dimensions: Rim diam: 65-66mm; Base diam: 94mm; Thickness: 7mm; Height: 262mm.

3. Various fine ware fabrics were recovered from the surface at Jazirat al-Hulaylah in Ra's al-Khaimah, and these are known as 'Type 12', 'White ware' (Kennet 1994: 190). Type 12 is described as a common earthenware in Islamic contexts. It is unglazed, and either white, buff or cream in colour (Kennet 1994: 190). According to Lane, unglazed wares with a buff or whitish coloured fabric are common throughout Western Asia (Lane 1947: 11). They are generally lightly fired and very porous (Lane 1947: 11), so as to allow moisture to seep through the walls and evaporate from the surface and thus cool the liquid inside the vessel (Lane 1947: 11; Posey 1994: 24).

4. A number of the burials may be comparable with material recorded during the survey in the Wadi Saqamqam. Unfortunately, many of the burials recorded by the Swiss have not been described in detail and are, therefore, difficult to use for comparative purposes.

Note: Recently, I have recorded a number of graves comparable to those of Wadi Saqamqam at al-Fara, Fujairah. These burials are located at the eastern end of the wadi, opposite the old house of Sheikh Suhail bin Hamdan al-Sharqi. GPS N 25° 8' 17.3" E 56° 14' 7". (datum: WGS84).

5. Dr. Sabah Jasim mentioned that he started to find material culture at a depth of around 50cm in the graves at Traif. However, the finds were minimal (Jasim *pers. comm.* March 2003). The graves in Wadi Saqamqam may be paralleled with those of Traif and must, therefore, be considered as prehistoric. See also: Jasim SA (*n.d.*) Excavations at Traif-Kalba: The Emirate of Sharjah. A seventh report. Sharjah Archaeological Museum.

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The pottery of Lima, Musandam, Sultanate of Oman

by Geoffrey King

Lima on the east coast of the Musandam territory of the Sultanate of Oman, north of the UAE-Omani town of Dibba, is the centre of one of the last surviving pottery production traditions of the region. However, it has received relatively little attention as a consequence of Musandam's inaccessibility until recent times.

The production of pottery in Musandam seems first to have been recorded as a result of the Royal Geographical Society expedition of 1971-72 **(1).** Subsequently, the Musandam pottery traditions of Lima and al-Alama were described in some detail by members of an expedition to the area led by Professor Paolo Costa in the 1980s **(2).**

The present writer visited the hinterland of Lima in March 2003 **(3)** and talked to a number of working potters. These potters, like the other inhabitants of the area, are Shihuh and they describe themselves as *badu.* They reside at a series of small homesteads scattered along the wadi system running inland from Lima but in the past, for security, people also used houses built into the face of the steep cliffs above the wadi. These cliff houses are now abandoned and the people live instead in the valley below. Some buildings still in use along the wadi are traditional stone structures but the majority of residences are of concrete and have been built in recent decades.

The people maintain small plantations close to their homesteads where there is easy access to water wells. They keep goats and sheep and produce pottery which is exported to the rest of Oman and to the UAE. Some people also work metal: steel knives termed *bîshala* (or *bayshala*) are made, as is the traditional Shihuh axe, the *jirz*, also of steel, and inlaid with copper or brass. Pottery and metal alike are worked in the courtyards of houses.

As far as I could establish, the pottery produced in the neighbourhood of Lima is not wheel-made. It is always unglazed, with a red slip used for decoration. In this respect it contrasts with the al-Alama glazed pottery tradition described by the Costa expedition. The clay currently used at Lima turns light ochre after firing but the varied sources of the clay and the firing method used must contribute to differences in vessel body colour.

The pottery makers at the homesteads which I visited around Lima all said that the clay they used is brought from several sources, some coming from in the mountains near to Lima while other sources are located further afield. Harf al-Ghabi (or al-Qabi), to the north-west of Khasab, was specifically mentioned as a clay source used now by the Lima potters, although it was emphasised that ceramics are not manufactured at Harf al-Ghabi itself. The clay from Harf al-Ghabi is currently brought to Lima by boat from Khasab, the main port of northern Musandam. However, I could not establish how long this process has been going on. The Lima potters also knew of Wadi Haqil near Ra's al-Khaimah as a clay source and of its pottery making tradition **(4).** Costa et al. (1991) record that clay was collected for use at al-Alama from a nearby mountain. They also report that clay for Lima came from Qabal in Musandam **(5).**



Plate 1. A wadi behind Lima, with firewood stacks

Lima pottery is made only to order. The time of firing is determined by the full completion of the order made for a given consignment. I was told the same of the Wadi Haqil production by the last surviving potter who had worked there until 1973. The pottery made around Lima is fired on open hearths and the kindling in the main is the local sidr (*Zizyphus spina-christi*). Stacked logs of sidr are seen outside every house and are used both for cooking and for firing pottery (*Plate 1*). There are no kilns at the pottery manufacturing houses that I visited outside Lima and I was told emphatically that kilns are never used there for making pottery. Instead, a very shallow pit is dug: the pottery for firing is placed in the pit, much of it being left above ground level. Firewood is then laid over the pottery and the wood is lit and left to burn until a temperature is reached adequate to make vessels of moderate strength. I was told that the firing takes an hour or so, but this point needs confirming: unfortunately, I did not see a firing take place. The method of firing used provides a very variable temperature and a characteristic of Lima pottery is the dark grey to black surface marking caused by scorching **(6).**

The decoration of Lima pottery with red slip is done with a colouring agent which I was told came from Hurmuz (Hormuz) on the Iranian side of the Gulf. I was shown the deep red-brown powder used for the Lima slip in dry form and also after it had been wettened (*Plate 3*). It has been suggested by Crocker Jones that the colouring agent, termed *mshak*, may be of vegetal origin, coming from the native plant *Fagonia indica* **(7).** However, it should be borne in mind that the colouring agent for the very similar red slip used at the Wadi Haqil kilns was an iron-rich ore from seams in the hills nearby, suggesting that the slip used at Lima may also be iron-based.

Both men and women make pottery in the Lima area. This contrasts with matters in the past at Wadi Haqîl where I was informed that only men used to make pottery while women did the final slip painting. This was explained at Wadi Haqil as being related to the strength required to make large vessels. However, the types of pottery now made at Lima are all quite small, and it requires no great strength to form them. It was pointed out rather emphatically by one of the Shihuh women to whom I spoke near Lima that she was much faster at making pottery than her husband.

The vessels that are made at Lima include a variety of large and small incense burners. The largest incense burners have four handles (*Plate 2*) whereas the smaller ones have only one or two handles. Some types of incense burner also have ash-trays added to them. Cooking bowls (*qadr*) made at Lima have conical lids. Coffee pots (*dalla*) follow a conventional shape similar to that usually used for metal dallas. Coffee cups are also produced. Large storage vessels are manufactured and are called *khars*. The biggest ceramic items made are *tannurs* for bread and these are a standard feature of each household. They are set in cement and placed in the open air.

The pottery made around Lima (*Plate 4*) is exported to neighbouring towns. I was told that it is sent to other parts of the Sultanate of Oman and to the UAE cities of Dubai and Fujairah. I have seen Lima incense burners at the revered grave of Shaikh Mas'ud near Khasab in north-west Musandam and also at very recent burials at Qirath, near Qidfa in Fujairah Emirate. Beatrice de Cardi informed me that she had found sherds from Lima



Plate 2. Four-handled incense burner

incense burners in 2002 near al-Rawda, along a track that runs inland to the Musandam highlands from Khasab. She suggested that these sherds represented breakage in transit of cargoes of ceramics being carried on pack animals **(8)**.

The antiquity of the Lima pottery tradition is hard to estimate at present, although both slip-painted and non-slip-painted unglazed pottery is found across Lima's best preserved archaeological surfaces, its very extensive graveyards. Unfortunately, the lack of kilns and the preference for firing pottery on open hearths may well have the effect of leaving little or no archaeological evidence. The potters to whom I spoke at Lima were insistent that pottery had been made there for many years, but were unable to be more specific on the age of the tradition.

There are interesting issues to consider regarding the relationship of the Lima tradition of pottery production to the better-known pottery tradition associated with Wadi Haqil. Did the Lima pottery manufacture fill the market gap created when the Wadi Haqil kilns closed in ca 1973? How long had the Lima production been in operation before that? Lima pottery certainly resembles the Wadi Haqil production in terms of ware and the use of slip painting. The Lima potters regard their industry as being old, and at some point there was probably an overlap between the Musandam production and that in Ra's al-Khaimah, but the length of the overlap and its significance have yet to be addressed. In short, Lima's pottery industry offers interesting directions for further research.

Notes

1. B. de Cardi, with sections by C. Vita-Finzi, and A. Coles, "Archaeological Survey in Northern Oman, 1972", **East and West 25** (1972), pp. 9-75

2. P.M. Costa, **Musandam**, London (1991), pp. 151-2; pp. 183-5; pp. 211-2. Ms Marcia Durr kindly showed me her collection of Lima pottery in Muscat in 2002 before I began my own research. There are now examples of Lima pottery at Bait al-Zubair Museum in Muscat.

3. I am indebted for the help given me by Mr Muhammad Khadim of Lima in arranging for me to meet local potters.



Plate 3. Colouring agent used as slip on Lima pottery

I am also extremely grateful to Mr Mark Forrest and Mr Harry Jayawardene of W.S. Atkins International, Ruwi, Oman and Mr C.H. Surya of Gulfa Engineering Contracting LLC, Muscat and their colleagues for their generous hospitality and assistance.

4. Pottery production in Wadi Haqil ended in about 1973. The Wadi has many kilns and probably was the pottery main supplier for Julfar, the trading port that is the predecessor of modern Ra's al-Khaimah. See R. Stocks, "Wâdî Haqîl Survey: November 1992", **Proceedings of the Seminar for Arabian Studies 26** (1996), pp. 145-163.

5. Costa, Musandam, p. 151.

6. This effect also occurs in pottery fired in much the same manner in Dhofar in southern Oman (Communication, Sarah White, Bait al-Zubair Museum, Muscat, March, 2003). Pottery is fired in the same manner in Socotra.

7. Costa, Musandam, p. 152.

8. Personal communication, October, 2002.

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Plate 4. A Lima potter

A Short Note on two archaeological sites in Qatar

by Clare Gillespie

*(**Editors' Note:** Contributions to **Tribulus** are generally related directly to the geographical area of the United Arab Emirates and immediately adjacent areas.The two Qatar sites mentioned have, in both geographical and archaeological terms, relationships with sites identified on the Western islands and coastline of the UAE. Bin Ghanim, in particular, is much closer to the Western islands than those islands are to the city of Abu Dhabi. This Note, therefore, helps to place the archaeology of Abu Dhabi's islands in a regional context).*

BIN GHANIM (Al Khor) ISLAND

Bin Ghanim Island lies just off the east coast of Khor Shaqiq bay. It measures 400 x 600 square metres, with limestone outcrops rising to a height of 8 metres above sea level. A small scatter of flint tools suggests that the island was visited by hunters during the Late Stone Age period. Archaeological features are concentrated in three main areas, all on flat sandy deposits covering beach-rock platforms.

The island's archaeology was initially investigated by the French Mission to Qatar between 1979 and 1982 (Edens 1981; 1994). The team excavated two areas, designated by them 'Khor Ile Sud' and 'Khor Ile Nord.' 'Khor Ile Sud' on the south-west side of the island contained a purple dye production centre dating to the Kassite period of the late 2nd millennium BC. Middens estimated to contain the crushed shells of between two and three million *Thais savignyi*, a marine Muricid gastropod, were found, together with the remains of small rectangular buildings and quantities of coarse, thick, greenish pottery. The dye, one of the most valuable trading commodities in the ancient Middle East, was produced by crushing the shells and boiling them to release chemical substances from the animal within.

Scarlet and purple dyed woollen cloth is known to have been in use in Kassite and post-Kassite Babylonia; its use was controlled by the ruler and was confined to the royal family and to powerful religious figures. The site supplied the first evidence that the production of this luxury product did not centre exclusively in the Mediterranean region, as had previously been thought. The 'Khor Ile Sud' site is, therefore, of great importance, both in terms of knowledge of the prehistory of Qatar and in understanding of trading relationships between Qatar and other parts of the region at this period.



Plate 1. Rectangular fire-pit at Site AK 1

'Khor Ile Nord' lies on the east side of the island. It is a site dating originally to the Bronze Age 'Barbar Period' [approximately 1950 BC] and was investigated first by the French mission of 1979 to 1982 and more recently by British and Qatari archaeologists in the Qatar Archaeology Project of 2000 (QAP, 2000). The site was designated by the later team as 'AK1'. The site is contemporary with the Dilmun civilisation, centred in Bahrain, which extended up the east coast of Arabia as far as Failaka island off Kuwait and is the only known site from this period in Qatar. Recent finds included rectangular (*Plate 1*) and circular (*Plate 2*) stone-lined fire pits, which may have been used for producing charcoal from the mangroves which surround the island. Such fire-pits have also been found, in profusion, on the islands of the Emirate of Abu Dhabi, to the east of the Qatar peninsula, and have been assigned, as a result of radiocarbon dating, to a range of periods extending from the 'Barbar Period' to the Late Islamic period (ADIAS, 2003).

AK1 was occupied at various times subsequent to the Barbar period of Dilmun, and, apart from Barbar, other ceramic material present includes Kassite, Sasanian and Late Islamic wares, including 'Julfar ware', manufactured in Ra's al-Khaimah, northern United Arab Emirates, from the 14th century until the mid-20th century.

Several shallow, circular, stone-lined pits found on the site were carbon-dated by the French archaeologists and dated to the 14th century AD. They contained many fragments of oyster shell and are thought to have been used in the processing of oysters to remove pearls. A method of pearl extraction in use in India in the last century consisted of leaving the oysters in pits for a few days until they decomposed and opened. A similar process may have been used at AK1. A site on the western side of the island was investigated for the first time by the Qatar Archaeology Project in 2000 and designated 'AK 2'. It consisted of several stone-built structures and a dense pottery scatter. There was some late Islamic pottery of the 17th to 19th centuries AD but the bulk of the surface ceramics consisted of Sasanian ware from the latter part of the late pre-Islamic period [between ca 227 and 651 AD]. A circular mound of stones was excavated and proved to be the remains of a small circular hut with a central post supporting a conical roof. After it was abandoned, a body was buried in the mound. The burial was flexed, and placed above ground in the cairn itself, probably indicating that the burial was pre-Islamic.

The coast of the Qatar mainland surrounding Khor Shaqiq bay contains several Late Stone Age sites where Ubaid pottery, manufactured in Iraq in the mid-sixth millennium BC, was found by French expeditions between 1976 and 1978. It was after investigations at one of these sites that an entirely new set of dates was

assigned to Qatar's prehistory. Previous to this, the Danish archaeologists who were the first to work in Qatar believed that Qatar had a Paleolithic past. The French investigation near Al Khor uncovered a wide range of hearths and tools, some of which were of types previously assigned a Paleolithic date. Radiocarbon dating indicated, however, that all the tools were produced between 5610 and 5080 BC.

MURWAB

The town of Murwab consists of some 250 houses, roughly arranged in three circular groupings, dating to the early Islamic period and is the oldest Islamic site in Qatar. There is also a small fort, two mosques and a cemetery. Unusually for a settlement of this period there are no surrounding fortifications. The site covers 125 hectares and is located on a flat limestone plateau 11 metres above sea level. It is 4.5 kilometres from the west coast. The fort is believed to be the oldest standing intact fort in the country and stands on the site of a still earlier fort which archaeological excavations suggest was destroyed by fire. Both forts are very similar in their lay-out to the 8th Century fort at al-Ukhaidir in Iraq.

Murwab is also the only non-coastal ancient settlement yet identified in Qatar. All other settlements had an economy in which the sea played a vital part. No convincing explanation has thus far been proposed as to why Murwab is so far inland, but the inhabitants may have exercised control of overland trading routes. The surrounding area is still well-known for its grazing and may have been even more fertile a thousand years ago. Curiously, there is no mention of Murwab in early Arabic literature or in Lorimer's *Gazetteer of the Persian Gulf* published in 1908. The site was investigated by Danish archaeologists in the 1950s (KUML, 1959) and British archaeologists in 1982 (De Cardi, 1973). It was extensively excavated by the French Mission from 1981 to 1982 (Hardy-Guilbert, 1984), and by the staff of the Department of Museums and Antiquities over the subsequent three years (Serouafim, 1987).

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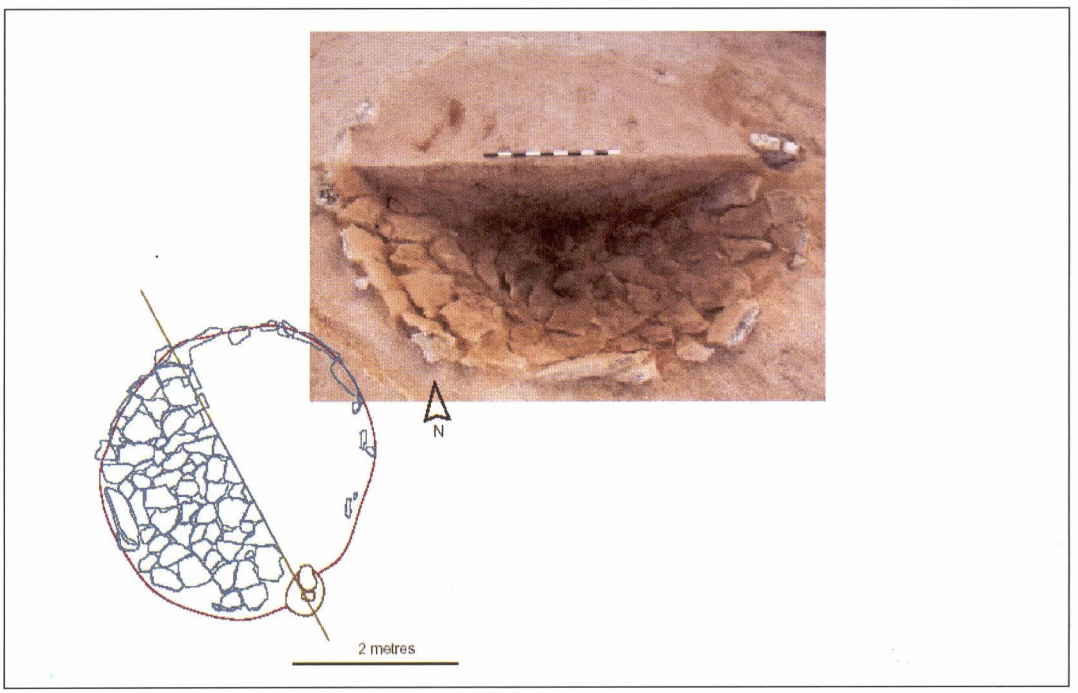


Plate 2. A circular, stone-lined firepit at Site AK1.

The diet of Osprey *Pandion haliaetus* on Marawah island, Abu Dhabi emirate, UAE

by Mark Beech

Introduction

In the UAE, the osprey *Pandion haliaetus* is a breeding resident on isolated coasts and islands, primarily to the west of Abu Dhabi city (Aspinall *pers. comm.*). It nests between November and March or April and its numbers are supplemented by migrants and winter visiting individuals between September and April (Aspinall 1996). Individuals, non-breeding or visiting, are present along the whole of the rest of the UAE coast, both within and outside the Arabian Gulf, throughout the year.

Ospreys are seldom found far from water, although they have been seen in the UAE well inland and away from water, presumably on migration, as well as at inland water bodies. They can often be seen perching on posts near tidal mudflats, or resting on other man-made structures. Some occur far offshore, where they utilise oil well-heads and platforms as a base (Richardson 1990). They build a stick nest, or eyrie. On islands these are often on the ground, although many are sited on top of man-made structures. Nests are typically made from a mass of twigs and flotsam, and may include dead seabirds or other animals, flip flops and even safety boots amongst other items. Each pair may build and defend several nests. The cup of the nest can be lined with various sea sponges. Two to four eggs are laid from November onwards.

Comparatively little is known about the diet of the osprey *Pandion haliaetus* populations inhabiting the coastline of the UAE. The author visited the island of Marawah in Abu Dhabi emirate in March 1999 and March 2003 as a member of the Abu Dhabi Islands Archaeological Survey, ADIAS, team. This provided an opportunity to examine two eyries located on the northern coast, one eyrie on the west coast and a recently used artificial feeding post, originally established for falconry, on the southern coastline, located just to the south-west of the village of Ghubbah. Ospreys have a diet composed entirely of fish and it has been reported that these are generally species for which there is no commercial market (Aspinall 1996: 48). No systematic investigation of osprey diet based on the analysis of actual fish bone debris has so far been carried out though. The aim of the study was, therefore, to provide an insight into osprey diet. By identifying the fish species represented, it was hoped that this would also shed some light on which marine habitats were being exploited. This analysis was made possible through the use of the author's extensive osteological comparative collection of Arabian Gulf fishes, collected during the course of his PhD at the University of York (Beech 2001). This reference collection is now maintained by the author for ADIAS in its headquarters in Abu Dhabi.

Sampling localities

Visits were made to three osprey eyries located on Marawah. Two of them were located on the northern

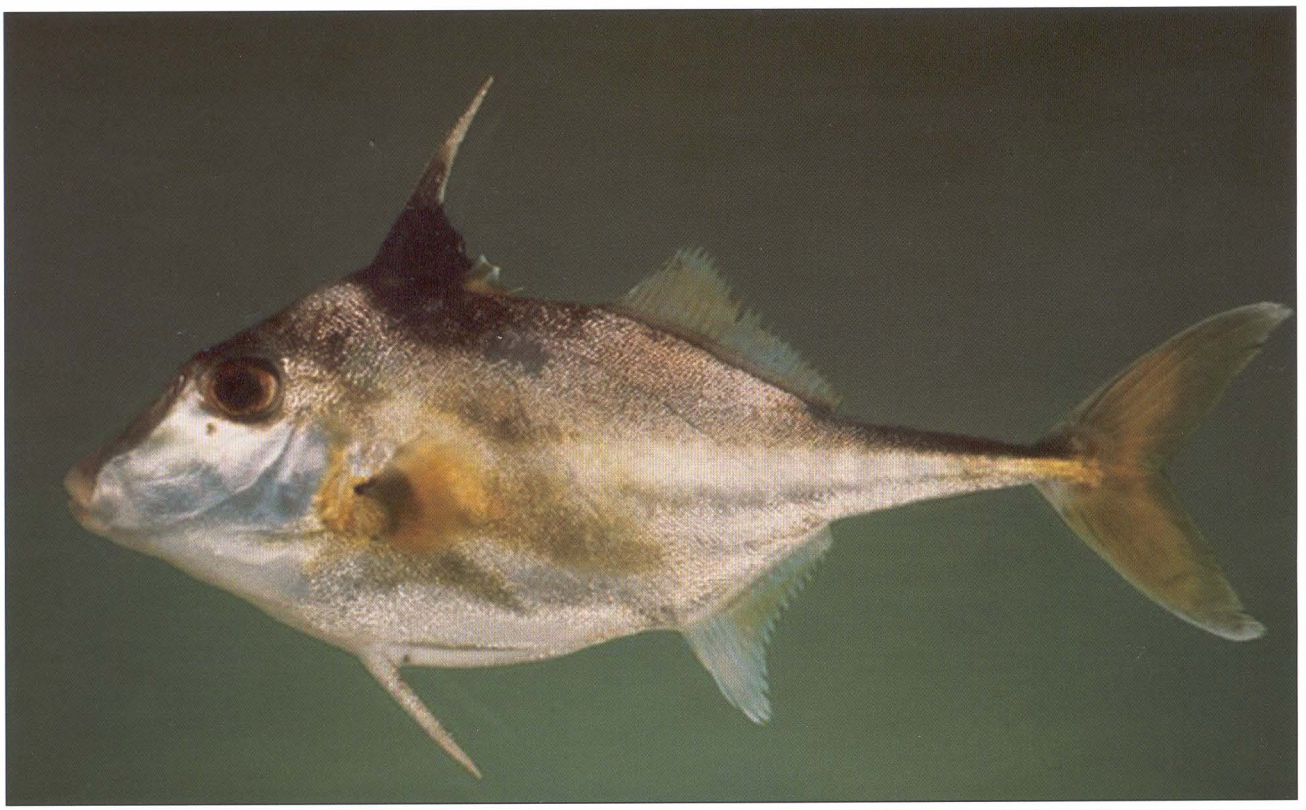


Plate 1. Shortnose tripodfish - *Triacanthus biaculeatus* (Bloch, 1786). Photograph by J.E. Randall 1997. Specimen caught in Cochin, India. Size: 17.6 cm Standard Length, 21.2cm Total Length. Source: http://www.fishbase.org/Photos/PicturesSummary.cfm?ID=4562&what=species

coast of the island, and the third was built on top of an abandoned fish-trap (gargoor), located on the western coast of the island at 53.24604 E, 24.26879 N (GPS datum = WGS84).
A number of visits were also made to the artificial feeding post on the southern coastline of Marawah, about 1.5 kilometres south-west of the village of Ghubbah at 53.26331 E, 24.27087 N (GPS datum = WGS 84).

Results

No bones were recovered from the three eyrie sites. Material present could all broadly be described as nesting material, being largely comprised of dried seaweed, small sponges, with occasional cuttlefish fragments. Other modern debris in the form of string and plastic was also observed.
The area around the feeding post pole located on the south-western coast was littered with fish bone debris. Fish bone fragments were scattered in a metre wide radius of the pole, with a considerable number of bones also being retrieved from the small platform at its top.
All of the visible bone fragments were systematically collected and subsequently sorted so that the fish remains could be identified. Identifications were made by using the author's osteological comparative collection of Arabian Gulf fishes. The results of this analysis are summarised in Table 1.
Needlefish were represented by three distinctive jaw (dentary) fragments coming from at least two individuals. These were from small-sized individuals, perhaps ca 50-60 cm in length. Needlefish are surface-dwelling fishes which feed mainly on small fishes. A number of genera and species are present within the Arabian Gulf (Randall 1995). These include the flat needlefish *Ablennes hians*, banded needlefish *Strongylura leiura leiura*, spottail needlefish *Strongylura strongylura* and the houndfish *Tylosurus crocodilus crocodilus*. It is not possible to distinguish which particular species is present from these bone remains.
A group of articulated caudal vertebrae was recovered which appeared to be from a single individual butterflyfish, probably only ca 10 cm in length. Their precise identification remains undetermined. Most species of butterflyfishes occur on coral reefs or rocky substrata at depths of less than 30 metres. One of the most common butterflyfishes in the Arabian Gulf is the black-spotted butterflyfish *Chaetodon nigropunctatus* which can attain a length of ca 14cm. Another common species in the Gulf is the longfin bannerfish *Heniochus acuminatus*, which can reach a length of up to 20cm. This latter species often occurs as solitary individuals or in pairs and is closely oriented to the bottom (Randall 1995: 253).
The remains of shortnose tripodfish *Triacanthus biaculeatus* (*Plate 2*) comprised the greater part of the osprey bone debris, amounting for 94% of the total number of individual fishes represented in the entire sample. Hundreds of bone fragments (*Plate 3*) were recovered, out of which a total of at least 49 skulls and 14 'tails' (ultimate caudal vertebrae) could be recorded amongst the remains. Most of the remains were from fish which were about 20-25cm in length.
The shortnose tripodfish can reach up to 30cm in length, and is an inshore species of flat sand or mud bottoms. It can also be found in estuaries (Randall 1995: 391). Tripodfishes feed on bottom-dwelling invertebrates, and are named after their long first dorsal spine and their two long pelvic spines. The pelvic spines can be locked in an extended position, which, together with an erect dorsal spine, form an effective deterrent to many predators. Tripodfish belong to the family called triplespines (Triacanthidae). They are distributed throughout the Indo-West Pacific, from the Arabian Gulf eastwards through the Bay of Bengal to eastern Australia, and northwards to southern Japan and China.

Osprey diet

Our knowledge of osprey diet is largely derived from studies which have been carried out in North America and Europe. Although osprey diet consists almost entirely of live fish, it is reported that they will occasionally eat frogs, snakes, ducks, crows, and small mammals (Burns 1974; DeGraaf *et al.* 1991; Dubois *et al.* 1987; van Daele and van Daele 1982). Their diet is variable and depends on regional differences in fish availability. For example, in Nova Scotia, alewife, smelt, pollock, and winter flounder compose 94 percent of their diet. Along the southern coast of New England, about one-half of the fish ospreys eat during the breeding season are winter flounder *Pseudopleuronectes americanus*. White herring *Alosa* spp. and Menhaden *Brevoortia tyrannus* each supply another 20 percent of the diet. Ospreys in western North America often eat suckers, carp, bullhead *Ictalurus* spp., and perch *Perca flavescens* when nesting near warm shallow lakes or reservoirs but eat trout when nesting near deeper, colder waters (Poole 1989, Van Daele and Van Daele 1982). Inland ospreys are likely to eat the same species of fish throughout the breeding season, but coastal populations change prey regularly in response to the seasonal migration of marine fish (Poole 1989).

TABLE 1. Fishes represented in the bone debris collected from the feeding post site on the south-western coast of Marawah. (MNI = minimum number of individuals, based on the most common non-repeatable anatomical element recorded.)

Family	Species	Common name	MNI
Belonidae	*? Ablennes hians, Strongylura leiura leiura, Strongylura strongylura* or *Tylosurus crocodilus crocodilus*	Needlefish	2
Chaetodontidae	*? Chaetodon nigropunctatus or Heniochus acuminatus*	Butterflyfish	1
Triacanthidae	*Triacanthus biaculeatus* (Bloch, 1786)	Shortnose Tripodfish	49

They usually feed twice a day, in the mid-morning hours and again in the late afternoon. Osprey are skilled hunters who spot their prey, hover, then plunge into the water, grasping the fish. Ospreys can penetrate only about a metre below the water surface, therefore, they generally catch only surface fish or those that frequent shallow flats and shorelines. The lower surface of the feet are covered with small pads called spicules, that help hold a struggling fish. If a fish is caught the bird will fly up into the air, shake the water from its wings, and then reposition the fish so that the head faces forward to reduce drag while flying. The bird finds a place to eat its meal and, once full, may either abandon remnants or save them for later consumption.

Fishes which are caught are typically 10 to 40 cm long and weigh under 1 kg. Instances are known of ospreys diving on fish too large for them, getting their talons stuck in the fish's flesh, and being dragged under the water and drowned. Ospreys rarely scavenge dead fish or take other animals, possibly only when live fish are unavailable, when they are migrating through unfamiliar territory, or when alternative prey are exceptionally abundant or vulnerable (Unitt 2000).

There have only been two previous studies of osprey diet in Arabia. One study examined the diet of a resident colony on Tiran Island in the northern Red Sea (Safriel *et al.* 1985). The second study, on the Farasan Islands in the southern Red Sea, showed that parrotfish (Scaridae), rabbitfish (Siganidae), needlefish (Belonidae), wrasse (Labridae), and angelfish (Pomacanthidae) are common prey. It was reported that an osprey, whilst feeding chicks, may catch up to eight fish a day, each weighing as much as 800g (Fisher *et al.* 1996b). The diversity of osprey fish diet is generally determined by the type of marine habitat found within the foraging area (usually close to the nest), where shallow lagoons and gently sloping reef platforms are favoured over narrow fringing reefs. Foraging has been monitored in different marine biotopes in the Farasan Islands such as coral, algae, seagrass, mangrove and sandy substrates (Fisher 1996; Fisher *et al.* 1996a).

Ospreys in the southern Red Sea breed from early November through to May. Most pairs lay eggs from mid-November into December. Ospreys at more northerly Red Sea latitudes generally lay about a month later, in early January. It seems likely that, as in the Arabian Gulf, ospreys have adapted to breed in the winter months to avoid the extremely high summer temperatures, as eggs require continual incubation and protection from the sun. The higher tides and more favourable southerly currents and winds in the winter months in the Red Sea may also play an important role, particularly in areas of extensive shallow water, which are often fished by ospreys.

Osprey diet on Marawah

The majority of the fishes represented in the osprey feeding debris from Marawah originate from shallow sand to mud bottoms. Such environments can be found around much of the island, and especially on the southern side, in the area immediately adjacent to the sampled osprey perch. Tripodfishes are normally not considered to be of great economic importance in the fisheries of the region. The author has often witnessed them being discarded onto the beach by fishermen dragging in their beach seine nets. The bone debris sample from the modern Marawah osprey perch perhaps, therefore, confirms the general assumption that their diet is predominantly made up of species for which there is no commercial market (Aspinall 1996: 48). Tripodfish and needlefish do occasionally appear in fish markets along the UAE coastline, although they only represent a minor percentage of the overall catch.

An interesting feature of tripodfish is their large livers, apparently an irresistible tasty snack for ospreys. The fish remains collected are nearly all characteristically damaged on one side of the fish where the osprey has ripped out the juicy interior of the tripodfish.

In contrast to the fish remains described above, archaeological excavations carried out in 1999 by the Abu Dhabi Islands Archaeological Survey (ADIAS) of a number of cairn sites, described as MR6, located on the north-western shore of Marawah have recovered fish bone remains which are likely to have been associated with former osprey sites (Beech 2001). The abandoned mounds of former tombs and kilns may have provided ideal perching points for ospreys hunting on the northern side of the island. The fish bone assemblages associated with these sites are somewhat different, however, to the modern assemblage described here from the southern side of the island. Fishes represented within them are predominantly composed of small parrotfishes (Scaridae)



Plate 2 View of tripodfish fish remains collected from beneath the osprey feeding post on Marawah (Photograph by Dr. Mark Beech)

ca 20-30 cm in length, followed by smaller numbers of emperors (Lethrinidae), with occasional needlefishes (Belonidae), groupers (Serranidae) and small rays (Elasmobranchii). All of these fishes were from small-sized individuals which, in some archaeological layers, were directly associated with osprey bones. A number of these fish, such as the parrotfishes, were clearly associated with coral reef type environments rather than just shallow sandy waters, perhaps indicating that the ospreys here fished out in the shallower reef waters encircling the northern side of the island. It seems likely that the ospreys on Marawah may have fished territorially, catching their fish which were then often consumed on nearby suitable perching points. The differences between the fishes represented in the samples between the northern and southern sides of the island may partly reflect this territoriality as well as contrasting access to reefs surrounding the island. It may also reflect the seasonal availability of different fish species around Marawah.

Please inform the author if you record the location of any new osprey nests or perching posts in the U.A.E., in particular if there are piles of old fish bones near any of them! This may provide valuable new information about the geographical and seasonal variability in the diet of this beautiful bird. Tripodfish are apparently used in traditional Chinese medicine (Tang 1987), although the author has been unable to find precise details about this at present. Information on this topic would be welcomed.

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NOTES AND COMMENTS

Further observations on the status of the Western Pygmy Blue butterfly in the UAE

Michael Gillett commented in ***Tribulus 12.2*** (pp. 20-21) (Autumn/Winter 2002) that *Brephidium exilis*, the Western Pygmy Blue, a small Lycaenid butterfly introduced to the UAE in recent times from south-western North America, has been seen only in relatively small numbers in the past few, relatively dry years, and he speculated that after an early and opportunistic population explosion in its new home, it may now be reaching an ecological balance with the local environment.

Monitoring the status of the Western Pygmy Blue is instructive as an example of the progress of introduced species generally. It may therefore be worthwhile to make a note of evidence that the Western Pygmy Blue has a somewhat longer history in the UAE than was previously documented, and that it may remain locally very common, even in recent years.

In reviewing my early field notes for other purposes, I was surprised to encounter, in an entry for 23 October 1993, a sketch of a "very small" butterfly that can only be a Western Pygmy Blue. The site was the Dubai Festival Grounds, a still-undeveloped area of land between the Dubai World Trade Centre and Karama, where the butterfly was feeding on flowering *Heliotropium kotschyi*, as *B. exilis* is known to do. At the time I had neither the knowledge nor the resources to identify any but the most common UAE butterflies, but in this instance care and patience have ultimately been rewarded. The record extends the known presence of *B. exilis* in the UAE by some five years prior to Gillett's first observations in Al Ain, which led him to identify and report the species in **Tribulus** 9.1 (pp. 22-23) (Spring 1999).

Like Gillett, I saw *B. exilis* in substantial numbers following its 'discovery' in 1998, most commonly at public sites in suburban Dubai landscaped with the low succulent *Sesuvium portulacastrum*. I have also seen it in other synanthropic settings, on *Sesuvium* and other saltbush species, near the Dubai camel racing area at Nadd al-Sheba, the plantations at Ruwayyah and the so-called Pivot Fields popular with birdwatchers near the Dubai Sewage Treatment plant. Also like Gillett, I have found it less common in the past couple of years at its customary suburban sites, but in my case this could be attributable primarily to repeated disruption of those sites for sewage lines, highway improvements, etc. Moreover, almost all UAE butterfly species have been reduced in numbers by the drought of recent years.

Observations in Sharjah in November 2002, however, extend the known range of the Western Pygmy Blue within the UAE and suggest that it is still abundant within favoured habitat, or, alternatively, that the population is continuing to 'explode' at its frontier. At saline flats within a large waste disposal site in the Sharjah industrial area, south-east of the National Paints roundabout, *B. exilis* was the only butterfly observed. There it was abundant on flowering circular cushions of the native *Sesuvium verrucosum*, where individuals numbered dozens per plant. It was also present in smaller numbers on nearby shrubs including particularly *Sueda vermiculata* and *Zygophyllum qatarense*. If it can effectively utilize these latter species and other widespread saltbushes (as the reports cited by Gillett suggest it can), then its future in much of the UAE seems secure. The Sharjah observations may also signify the Western Pygmy Blue's successful colonisation of the "natural" environment versus landscaped or agricultural sites.

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Island Gazelles and Desert Hyacinth

The note by Michael Gillett in **Tribulus 12.2** about *Cistanche tubulosa* being grazed by Mountain Gazelles *Gazella gazella* on Marawah Island prompts me to write to point out that it is more normal on the mainland coast and the islands west of Abu Dhabi for such behaviour to be displayed by 'reem', or Sand Gazelle, *Gazella subgutturosa*. This species does not occur on Marawah, where the introduced stock are all *G. gazella*.

Gazella subgutturosa would appear to be better adapted to the environment of Abu Dhabi's coastline than *G. gazella*. *G. subgutturosa* is present on the islands of Bahrani, Futaisi, Al Aryam, Bu Qirmah, Qusabi, Bu Shara, Rufayq and Abu al-Abyadh, all, like Marawah, west of Abu Dhabi, as well as on the Dabb'iya peninsula. It is not known to what extent they browse the leaves of mangroves *Avicennia marina*, but they clearly use mangroves for shade and cover, particularly during the summer. This behaviour has been observed only during periods of low tide, and it is unlikely that the gazelles would tolerate the regular partial immersion that would be required at higher tide levels.

These observations suggest a difference in foraging patterns between the two gazelle species, at least on the Abu Dhabi coast and islands and may help to indicate natural distribution patterns prior to recent introductions. If the gazelles are not able to gain much nutritional benefit from mangroves - and there is seldom much evidence of browsing - there must be very little natural food available for them, and a very limited range of food items. The halophyte *Arthrocnemum macrostachyum* may well be important in this context, but there is no doubt that its parasite, *Cistanche tubulosa*, is a favoured food item. I have seen abundant evidence of the rhizomes of *Cistanche* having been excavated and eaten by *G. subgutturosa* on Futaisi, and the same phenomenon, but not on such a large scale, on the Dabb'iya peninsula. On Futaisi, it appeared that the gazelles were excavating for the rhizomes before the flower buds broke the surface. As *Cistanche* does not produce any leaves, there would have been no visible sign of the plant before the emergence of the flower, so the gazelles must have been using their sense of smell to

locate the rhizomes. These storage organs must be a valuable source of carbohydrates and water, and perhaps also minerals. In contrast to Gillett's observations on Marawah, I have not noted any significant amount of grazing on the flowers. Clearly, the rhizomes would be a more valuable food source.

The origins of the present populations of *G. subgutturosa* stretching from Futaisi to the island of Rufayq, west of the Dabb'iya peninsula, are difficult to determine with certainty. Certainly introductions have been made and the populations are kept artificially high by supplementary feeding. It is possible, though, that a remnant indigenous population was still present, at least in some areas, when the first introductions were made, and that the introduced animals inter-bred with the wild stock, and learned from the latter some of the tricks for survival in this harsh environment.

Wilfred Thesiger reported in his 1949 article in *The Geographical Journal* that *G. subgutturosa* was present on 'islands west of Abu Dhabi city and on rocky headlands in sabkha'. Further evidence for the indigenous status of at least part of the *G. subgutturosa* populations to be found on the inshore islands is a report from a member of the Qamzi sub-tribe of the Bani Yas, who stated that his father used to catch gazelles in nets when they moved through shallow water between the islands of Futaisi and Al Aryam (Bu Khushaishah) at low tide (K.S. al-Qamzi, *pers. comm.*).

This continued at least until the 1950s, before gazelles were introduced to the islands and provided with supplementary food. From Al Aryam, it would have been easy for gazelles to cross to the mainland sabkhas (where they are still occasionally seen), and thence westwards to the Dabb'iya peninsula and the inshore islands of Bu Qirmah, Qusabi, Bu Sharah and Rufayq that lie to the west. Indeed, despite the presence of introduced (and artificially-fed) *G. subgutturosa* on Futaisi and adjacent islands, the gazelles on the mainland coast, probably still at least partly wild stock, may still cross to the islands.

Introductions of gazelles to offshore islands also began prior to recent development, however. Thus there have been reports of young gazelles captured during hunting trips to Al-Khatam in the 1950s being released on the island of Balghelam, north-east of Abu Dhabi. Both *G. gazella* and *G. subgutturosa* are present on the island today (P. Hellyer, *pers. comm.*, citing HE Sheikh Surour bin Mohammed Al Nahyan). Balghelam is further offshore than the chain of islands from Futaisi westwards to Rufayq, and would not have beenso easily reachable by wild gazelles from the mainland.

Another observation to suggest different foraging patterns of the two gazelle species comes from Abu al-Abyadh where very large numbers of gazelles are maintained, all believed to descend from introduced stock, although the origins of these is not known. The great majority are *Gazella gazella*, which tend to remain in large herds on bare saline flats near where they are fed. *G. subgutturosa* will join these herds but they also frequent the shores either individually or in small family groups, probably searching for *Cistanche tubulosa.*

Gazella subgutturosa has become rare as a native inhabitant of the inland deserts of the UAE, and its chances of survival may be steadily declining because of the rapidly increasing number of roads, walls and fences which are steadily dividing the desert into separate units. Inherited knowledge about where to find particular food resources at different times of year may soon be of little value to the inland gazelles. The populations maintained on the islands are, therefore, very important, particularly if it can be established that they are at least partly descended from native animals which had developed foraging habits to permit them to survive in the harsh coastal conditions.

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I am very grateful to Peter Hellyer for comments on this note, additional ideas and information on introductions of gazelles to Abu Dhabi's islands.

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BOOK REVIEWS, RESEARCH & PUBLICATIONS

Reviews

The Comprehensive Guide to the Wild Flowers of the United Arab Emirates

By Marijcke Jongbloed with G. R. Feulner, B. Böer, A. R. Western. Published 2003. ERWDA, P.O. Box 45553, Abu Dhabi, U.A.E. 576 pages, hardback. ISBN 9948-408-24-1. Price on application.

This newly published guide to the flora of the UAE goes far beyond anything previously available to plant enthusiasts. It describes 550 wild plants in detail, giving a description, habitat, distribution, traditional uses and a remarks section. A further 250 species are briefly recorded in footnotes. In the section entitled "How to use this guide", the author suggests that the work is intended for professional and amateur botanist alike, but that scientific terminology has been kept to a minimum to make it as accessible as possible to non-specialists. It provides a well illustrated check-list of 755 local species divided into 81 families, and will supplement the *Annotated Check-list for Plants in the U.A.E.* (Zodiac Publishing, 2000), by three of the same authors.

Vernacular names in English and Arabic are provided wherever known, and there is an updating of some of the scientific names. As in previous floral guides of the region, the geographical area covered includes the border areas of Oman where it is possible for UAE residents to go without a visa, similarity of habitat in the border areas having prompted this approach. All plants that occur and survive in the UAE without irrigation, including escapees that are in the process of naturalisation, are included.

The introduction includes a brief description of each of the UAE habitats is given, together with notes on climate, geology and plant adaptations to desert climates. There is also a brief list of plants typically found in each of the different habitats. The book is embellished by a number of full-page colour plates of floral scenes in the UAE and Oman, all taken, as far as I can see, in the spring. For some reason the picture of Wadi Shis occurs twice, on pages 419 and 448.

Plant enthusiasts in the UAE have, until now, been dependent upon three publications, *The Flora of the UAE, an Introduction* (A.R.Western, 1989), *Wild Flowering Plants of the UAE* (Fauzi M. Karim, 2002), and Marijcke Jongbloed's own work *The Living Desert*, (1987), the only one of the three to be available in local bookshops.

Of these three, only Western's book can compare in scope with The Comprehensive Guide (TCG). Although it has less than half the number of species documented by Jongbloed, it was formerly the major reference book for all serious UAE-based botanists. This will now change with the publication of TCG, which will doubtless become the standard reference for many years to come, possibly with subsequent editions.

TCG has at least three major strengths. First of all, its coverage is impressive. With over twice as many species as the Western book, TCG has, for example, 66 grasses (Poaceae). This is the largest section in the book and is a welcome addition to the limited coverage provided by the three works mentioned above, especially at a time when the grasses are expanding in extent and number into the newly-built urban and garden areas of the UAE.

Secondly, the photography is good, and provides inset pictures of the inflorescence and other details. The pictures will be a great help in plant recognition, and represent a marked improvement over previous works.

Thirdly, the species list has been updated to include the latest re-naming. Thus *Alhagi maurorum* has become *Alhagi graecorum*, while the various species of *Tribulus* cited by Western have now lumped together under the species name *arabicus*.

Distribution of species will always be a problem, and although some attempt in TCG has been made to update and improve on the distribution as provided in the Western book, it seems that Abu Dhabi emirate, in particular, has not been researched sufficiently. The distribution maps are also rather small, and ergo, somewhat imprecise Also, as a non-specialist, I would have preferred more scientific terminology in the descriptions, for purposes of recognition.

Overall, *The Comprehensive Guide* is a major addition to the natural history of the UAE, representing years of painstaking research and dedication. Although built on the work of previous generations of botanists, this book represents a great step forward for Arabian flora and for the UAE. It is destined to become the standard reference for amateur and professional alike for many years to come.

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The Island of Abu Al Abyad

Edited by Richard Perry. Published in 2002 by Environmental Research and Wildlife Development Agency, ERWDA, PO Box 45553, Abu Dhabi, UAE. ISBN 9948-408-19-5. 136 pp. Hardback. Price on application.

Abu al-Abyadh (or Abu Al Abyad, to use this book's curious spelling), is the largest of the UAE's many islands but one of the least well known, so it is very fitting that the Environmental Research and Wildlife Development Agency, ERWDA, should have produced this large and well illustrated book documenting its geology, archaeology and natural history, as well as some of the human activities on the island. Unfortunately the reader will not obtain any clear overview or visual impression of the island—there are only a few small diagrammatic maps and only one oblique aerial photo. Massive

projects, which might loosely be called "ecological restoration", have been under way on the island for many years, but the book contains nothing on this interesting aspect.

There is a general lack of overview of the island, which is compounded by the very disparate nature of the various chapters. These seem to be aimed at different audiences, with no attempt at any kind of unified approach. The chapters on geology, archaeology and birds are very professional and provide an appropriate level of information. The chapters on marine life, mammals and vegetation reflect the fact that information was scarce and no survey was carried out specifically for the book. Reptiles, insects and other terrestrial invertebrates do not receive even a passing mention. The lack of an index is also unfortunate, making the book less useful as an information source.

The chapter on birds by Simon Aspinall pays a lot of attention to the status of species, e.g. species that have colonised the island naturally and have established breeding populations, introduced species that have become established, introduced species not yet established and so on. The mammal chapter, on the other hand, draws a veil over this important issue and describes aspects of the biology of Arabian oryx, Asiatic mouflon, two species of gazelle and Arabian hare, calling them all simply 'wild'. We can assume, but we are not told, that the populations of all but the latter were introduced to the island without any native stock being present at that time. The descriptions of these species contains some useful information but nothing about their behaviour on or adaptation to the conditions on Abu al-Abyadh. We are also left wondering whether the island supports any bats, gerbils, jirds, house mice or feral cats.

The marine section clearly reflects the lack of survey. Most of it contains basic information about the biology of a small selection of fish that occur in the area. It is unfortunate that only scientific and local names were used here, and not the English, even for families, e.g. jacks, grunts and groupers. Strangely, the word 'seaweed' is used instead of 'algae'.

There is a section on 'Molluscs', which could really have been called 'Remains of Molluscs' as the information is confined to shells. It would have been very easy to collect relevant information about the typical molluscs of the intertidal zone (of which there are plenty), but instead we are told about the shells of just seven bivalves and four gastropods washed up on beaches. What people want to know is where and how the animals live! This section also fails to mention that *Littoraria intermedia* (reported as merely another shell) is the mangrove tree snail and it misinforms the reader that it is a species of 'rocky intertidal habitats'.

As one of ERWDA's responsibilities is to maintain an overview of environmental impact assessments in the Emirate of Abu Dhabi, it is regrettable that this book contains no information which could be used as background baseline data. The oil industry spends much money collecting information on benthic invertebrates, mangrove and coral communities and levels of pollutants in seawater and sediments, and some of it from the immediate vicinity of Abu al-Abyadh, but such information did not apparently reach the producers of this book, if, indeed, they tried to seek it out.

It is not surprising that the book contains very few recommendations or advice to the owner, as it makes little attempt to deal with ecology or conservation. One notable exception to this concerns ospreys, which one might have been expected to have had a population of at least a dozen pairs on the island but, when last investigated, had only a single unsuccessful pair. The recommendation for strict protection and provision of artificial nest sites is, therefore, very apposite.

Readers may be surprised to learn that there is a large mariculture operation on the island. They will be even more surprised to learn that the objective of all this activity is to boost the stocks of fish and shrimp in the surrounding sea. As yet there is no information on whether this is having any real benefit. It certainly is not doing so in terms of boosting the osprey population!

Further surprises lie hidden in the text. There is also farming of a species of freshwater tilapia, presumably fed on imported fish meal and maintained in desalinated seawater, for the purpose of providing a supply of nutrients for the agriculture on the island. This might avoid buying nitrate and phosphate fertilisers, but the energy balance of the operation must be quite an eye-opener! It would have been interesting to know whether any produce is exported from the island.

Overall, this book must be welcomed to the growing body of literature on the natural history of the UAE. Despite some poor quality and inappropriate photographs (especially the underwater ones), it is an attractive and well produced publication. Clearly, however, it would have benefited from stronger editorial coordination and attention to scientific detail.

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Arthropod Public Health Pests in the Emirates How to recognise them. How to control them

By J. Balfour. Zodiac Publishing, Dubai. ISBN 1-904566-10-3. 1044 pp., A5, softback. Dh 35, from good bookshops.

The objective of this book is stated clearly at the outset: it is to inform residents of Dubai of the potential pests that they may encounter, and the hazards thereof. The illustrations throughout help the non-specialist to identify the most frequently encountered pests that we see in our everyday encounters with our natural world, whether this is voluntarily or not!

The book is divided into blood-sucking pests, hygiene pests and venomous arthropods. Whilst this is useful if you've just been bitten by a blood-sucking arthropod, it is more difficult to use if you've spotted a fly in your house and would like to know more about it, since flies occur in more than one section. Furthermore, we often don't know whether we have been bitten or stung and that means readers – and victims – might have to pore through quite a lot of the book's pages before finding the culprit.

Having said that, the information provided in the book is accurate, applicable to more than just the emirate of Dubai, and useful practical advice is given. Thus, if you find arthropod remains in what appear to be unlikely places, comparing them to some of the photographs will help to identify what you are dealing with. All illustrations give an indication of size. This is most useful as many arthropods can be similar in appearance, but very

different in size. There is also advice as to how to deal with unwanted visitors and house-guests. All in all, this book is a useful addition to known arthropod literature.
As someone interested in specific identification, I was a little disappointed that species lists were not included, but, as the author points out clearly, practical advice is more useful if you're able to identify related species and are then able to ascertain whether these are a risk or not. For further identification, more specialist equipment is needed and thus becomes a very different matter.
I would recommend that every household should be aware of this book, and any organisation, private or government, that deals with people and hygiene issues should have a copy of it on their shelves. Furthermore, a drive to make schools aware of it should also be pursued as this would help to prevent potentially serious situations, such as cases of allergic reactions to ant venom recorded in the UAE in the last few years.
The slight worry I have as an ecologist/conservationist is that much of the advice deals with how to kill using aerosols and other chemicals. Sometimes this is not necessary, and I would urge anyone to weigh up their options as, frequently, the chemicals used can cause you and non-target species more harm than the arthropods you are trying to control. However, when you or members of your family are at risk, take the advice given since the information was researched and written by the former head of the Pest Control Section of the Dubai Municipality!

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Before the Oil: A personal memoir of Abu Dhabi, 1954-1958

By Susan Hillyard. Ashridge Press, Derbyshire, UK. 2002. Hardback. 236 pp. ISBN 1-901214-02-8. UK pounds 20, and available at good bookshops in the UAE.

Susan Hillyard is the widow of Tim Hillyard, who was Abu Dhabi representative from 1954-1958 of Abu Dhabi Marine Areas, now ADMA-OPCO. They were among the first Europeans to live in Abu Dhabi, and also had their daughter, Deborah, born in 1953, living with them – the first European child to live here. Susan Hillyard was known, of course, as Umm Deborah.
The Hillyards came to Abu Dhabi at the very beginnings of the development process, and this book records some of the earliest changes – the first Western-style house, the first generator, some of the first cars, and, of course, the early stages of the oil industry, with the discovery and then the development of Umm Shaif and Das.
Susan Hillyard was especially privileged because, as a woman, and one who spoke Arabic, she was able to meet with Emirati women, building up, for example, a good relationship with Sheikha Salamah, the mother of President HH Sheikh Zayed and his brothers. Her descriptions of Sheikha Salamah are unique, and valuable.
She also knew, well, HH Sheikh Zayed and all three of his brothers, Sheikh Shakhbut, Sheikh Hazza and Sheikh Khaled, while her daughter was a playmate of Sheikh Nahayan bin Mubarak, who is the same age. She provides delightful descriptions of them all.
Hillyard deals, in particular, with items related to daily and family life. She describes the *'arish* houses and the way they were built, food, customs, disease and medicines and a variety of other little details, and provides a fascinating insight into Abu Dhabi before oil – problems and all.
There is no other book that deals with life in Abu Dhabi at this period. That of Mohammed Al Fahim, 'From Rags to Riches', for example, deals with the 1960s, not the 1950s, and he recalls childhood memories of the 1960s, while Susan Hillyard was an adult, and a foreigner, ten years earlier. The tone of the book is one of great affection for Abu Dhabi and its people, and it is a valuable addition to knowledge of the country at that time.
I have only one mild criticism: I would like to have read more about the discovery by her husband of the archaeological site at Umm al-Nar, thus prompting the beginnings of archaeology in the Emirates.
That does not, though, detract in any way, from the value, and importance, of this book. Susan Hillyard notes in her Introduction her thanks to President His Highness Sheikh Zayed "for insisting that I write this book" and the President deserves credit for his insistence. Thanks are due, too, to Sheikh Nahayan and to BP, both of whom provided financial support for the book's publication, with BP also supplying many of the pictures, previously unpublished.
This book should be made widely available – to teach both nationals and expatriates about life in Abu Dhabi before oil. If you want to know what life was like in Abu Dhabi nearly fifty years ago, there is no better source available than this book. One hopes, too, that it will also, rapidly,. be made available in Arabic.

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Seafarers of the Gulf - An Arabian Album

By Ronald Codrai. Published 2003. Motivate Publishing, P.O.Box 2331, Dubai. ISBN 1-86063-132-0. hardback. Available in all food bookshops. Price Dh **xxxxx**

Collectors of fine books of old photographs of the United Arab Emirates and Oman will need no introduction either to the name Ronald Codrai, or to the magnificent images, in both black and white and colour that he took during his years in the country in the early 1950s. Indeed, this book is the seventh compilation of his photographs of the area. it is a worthy companion to its predecessors, in particular to the four others in the 'Arabian Album' series.
This book concentrates not on the land and its people but, rather, on the maritime traditions of the country. "The purpose of this book," he writes in his Introduction, "is to place on record the last years of the old way of life in the Trucial States as it related to the sea: a time when the Gulf could claim to have been the home of the largest surviving merchant sailing fleet in the world."
When Codrai came to the UAE in the late 1940s,the pearling industry, already over 7,000 years old, was in terminal decline, but he was in time to record the last pearling fleets going out, as well as the great merchant dhows that were still making journeys of many months at a time from the Gulf down the coasts of East Africa or

away to India.
These are well recorded in the marvellous photography, linked by short but evocative text that sets the scene.
Most of the pictures have never been published before, although a few have appeared elsewhere - one stunning image of a swarm of locusts over Dubai Creek, for example, having first appeared in *National Geographic* back in 1954. The image stands the test of time, 49 years later.
Ronald Codrai penned his introduction to this book in January 2000, just after he was diagnosed with terminal cancer, and he died in May that year. The book has been brought to fruition by his son, Justin, and the Motivate team, with the help of sponsorship from the National Bank of Dubai. All deserve credit for their efforts.
Sadly, the quality of the imagery and of Codrai's spare prose is not always matched by the geographical knowledge of the caption writers, with several irritating errors. Thus one refers to 'Khorfakkan, Kalba' as though it were a single place, (Khor Fakkan actually being shown), and another to a photograph of a headland north of Dibba as being in Ra's al-Khaimah when, of course, it is in the Musandam province of Oman.
These, though, are minor quibbles, easily set right in the future reprints that will doubtless take place.
Sir Wilfred Thesiger, rightly, is acknowledged today for the way in which he placed on record, in the written word as well as on film, the vanishing life of the Bedu of Arabia. Ronald Codrai's prose may not match that of his old friend Thesiger, but his photography more than makes up for that, not only in its enormous quantity, but in its quality as well.
There are still those who believe that the UAE before oil was simply desert, sand dunes, camels and oases, perhaps wioth a few pearls thrown in. That was, of course, never a complete picture, but this book serves a valuable purpose in filling in the rest of the story. *Seafarers of the Emirates* is a record of those who lived by, sailed upon and harvested the sea.
The people of the UAE have a long, and a proud maritime heritage. Two thousand years ago, they sailed regularly to China. Five hunded years ago, Ra's al-Khaimah's Ahmed bin Majid, the 'Lion of the Sea', wrote manuals of navigation for the Indian Ocean that continued to be used until the 19th Century. Two hundred years ago, the Qawasim Rulers of the northern emirates could put an estimated 20,000 saiilors to sea. The men whose life Codrai recorded were inheritors of a great tradition. Through this book, he provides them with a fitting memorial.

PH

Published Papers

The following papers or short notes on UAE natural history, history and archaeology have been published recently and have been brought to the attention of the editors. Authors are invited to submit details on a regular basis to this bi-annual bibliography.

Natural History

The Phoenix No. 19 (January 2003). ISSN 0268-487X. *Editor: Michael Jennings, Warners Farm House, Warners Drive, Somersham, Cambridge*shire PE28 3WD.
E-mail: arabian.birds@dial.pipex.com

The 19th issue of the annual journal of the long-running Atlas of the Breeding Birds of Arabia project, with the latest news on breeding birds from around the peninsula. Of special UAE interest is

Diskin, D.A. (2003). *First breeding of common coot in the United Arab Emirates,* p. 8

(The breeding site was the 'Wimpey Pits' - near the Dubai Sewage treatment plant, and, following the 1st breeding record in 2002, the species bred again successfully in May /June 2003.
As this issue of ***Tribulus*** went to press, however, the 'Pits' were in the process of being completely filled in, as part of a 'Chinatown' residential development scheme, Efforts by members of the Emirates Bird Records Committee and others to persuade the local authorities to recognise the importance of the site on environmental and tourist promotion grounds failed to achieve any response).

Archaeology

Adumatu
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A relatively new journal, Adumatu is the only bilingual periodical on Arabian archaeology, though with most contribitions in Arabic. The latest issue has an overview of the Ubaid culture in the UAE:

Al-Tikriti, Walid Y. (2003). *Tracing al-Ubaid Culture in the United Arab Emirates.* **Adumatu 7**: 47-64

Bulletin of the Society for Arabian Studies, No. 8 (2003).
c/o The British Academy, 10, Carlton House Terrace, London SW1Y 5AH, UK.
E-mail: sasbul@ijnet.demon.co.uk.

The usual roundup of news from throughout the peninsula, with much on the UAE, including details of contents of recent issues of ***Tribulus*** and reviews of recent work by many of the country's archaeological teams. The Bulletion is heavily orientated towards history and archaeology - and it would be nice to see more papers and notes related to natural history, geology and related topics.
This year's Bulletin has two papers of particular interest to UAE readers, *viz.*

Al Tikriti, Walid Y. *An Early Islamic falaj from Al Ain* (pp. 11-19).

This paper is especially welcome, since little is known of the early Islamic period in the UAE, particularly inland. In Al Ain, most evidence has presumably been long since buried under more recent development. C14 dating and pottery suggest that the *falaj* dates to the Umayyad and early Abbasid periods.

Biaigi, Paolo. *New rock art sites in the Musandam peninsula* (pp. 24-25).

Journal of Oman Studies

Vol. 12 of the Journal of Oman Studies contains the following papers related wholly or partly to work done in the United Arab Emirates. The resumption of regular publication by the JOS is most welcome.

Beech, M.J. (2002). *'Fishing in the 'Ubaid: a Review of Fish-bone Assemblages from Early Prehistoric Coastal Settlements in the Arabian Gulf.'* **JOS 12:** 25-40.

Magee, P. (2002). '*The Indigenous Context of Foreign Exchange between South-eastern Arabia and Iran in the* Iron Age.' **JOS 12:** 161-168.

Uerpmann, H-P. and Uerpmann, M. (2002). *'The Appearance of the Domestic Camel in South-East Arabia.'* **JOS 12:** 235-260.

Also of interest for those intrigued by the history of archaeology in south-eastern Arabia is the following paper by the doyenne of south-east Asian archaeology.

De Cardi, B. (2002). *'British Archaeology in Oman: the Early Years.'* **JOS 12**: 11-16.

Proceedings of the Seminar for Arabian Studies, Vol. 32 (2002).

Kennet, D. (2003). *'The development of northern Ra's al-Khaimah and the 14th-century Hormuzi economic boom in the lower Gulf.'* **PSAS 32**: 151-164.

A summary report of a 1994 field survey in Ra's al-Khaimah, and analysis of results suggesting an economic boom coinciding with the rise of Hormuz.

Other Papers

Kennet, D. (2002). *'Sasanian pottery in Southern Iran and Eastern Arabia.'* **Iran 40:** 153-162.

An important review of the Sasanian period pottery from the archaeological site of Kush, in Ra's al-Khaimah.

Hull, D. (2003) '*A Survey of the Island of Abu'l Abyadh, UAE.'* **Antiquity, Vol. 77,** no. 295.

A short overview of the ADIAS work on Abu al-Abyadh.

Papers Presented

Archaeology and Palaeontology in the UAE

A Symposium with the above title was organised by the Zayed Centre for Heritage and History, part of the Emirates Heritage Club. at Le Mercure Hotel, Al Ain (2nd-3rd April 2003). The following papers were presented at the symposium, and publication is provisionally planned for 2004.

A new Late Miocene fossil site in Ruwais, United Arab Emirates [Dr. Mark Beech (ADIAS) and Will Higgs, (York)];
A Late Miocene Fossil Proboscidean Trackway from Mleisa, Abu Dhabi Emirate [Will Higgs (York), Dr. Drew Gardner (Zayed University) & Dr. Mark Beech (ADIAS)];
Neolithic Life and Death in the Desert – Considerations after 8 seasons at al-Buhais 18 [Dr. Margarethe Uerpmann (Univ. of Tubingen, Germany), Professor Hans-Peter Uerpmann (Univ. of Tubingen) & Dr. Sabah Jasim (Sharjah Directorate of Archaeology)];
Recent Work at Akab, Umm al-Qaiwain [Imtithaal al-Naqeeb (Director, Umm al-Qaiwain Museum)];
The al-Sufouh 2 excavation site in Dubai [Helmut Brueckner (University of Marburg), Claudia Gruber, Henriette Manhart, Angela von den Driesch, Peter Werner (all University of Munich)];
Excavations at Qarn al-Harf [Ahmed Hilal (National Museum of Ra's al-Khaimah)];
Recent survey and excavations in Dubai [Dr. Hussain Qandeel (Dubai Museum)];
Excavations at Bithna [Dr. Anne Benoist (CNRS, France)];
Falayah - Fortified farmstead of the Qawasim [Christian Velde (National Museum of Ra's al-Khaimah)];
Bayt Sheikh Suhail bin Hamdan al-Sharqi: A preliminary study based on ethnographic and archaeological information [Dr. Michele C. Ziolkowski (Fujairah) and Sheikh Abdullah bin Suhail al-Sharqi (Fujairah)].

The Symposium, first of what is provisionally planned as an annual series, was designed to bring together archaeologists and palaeontologists working in the UAE at the end of the main field season, to permit an exchange of information on the results of the previous winter's research. Work from six of the seven emirates was covered, with only Ajman not participating.

29th Annual Conference of the Association of Art Historians, London, 10th-13th April 2003.

Daniel Hull and Stephen Rowland (both formerly of ADIAS) presented a paper on *"The pearl trade in Abu Dhabi Emirate,"* drawing, in particular, on results of survey work on the island of Abu al-Abyadh.

Forthcoming Conference

History of the United Arab Emirates

The Zayed Centre for Heritage and History is preparing a conference on the history of the UAE since the beginning of the 1st Millennium AD, to be held in December 2003. The focus of the conference will be on the Islamic period, although some attention will be paid to the last few centuries of the pre-Islamic era.
The Conference language will be English.
Further information is available from the Zayed Centre for heritage and History (Director; Dr. Hassan Naboodah), on e-mail: **zc4hh@zayedcenter.org.ae**

تريبيلوس

مجلة جمعية الامارات للتاريخ الطبيعي

المجلد ١٣، ١

ربيع / صيف ٢٠٠٣ م

